

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF NUCLEAR DENSITY TESTS FOR SOIL (DIRECT TRANSMISSION)

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					% MOISTURE - ITM 506⁽¹⁾			
Location of Tests	Station				A	Wt. of Pan & Wet Material (0.01 lbs.)		
	Reference to Centerline				B	Wt. of Pan & Dry Material (0.01 lbs.)		
	Elevation or Lift Number				C	Wt. of Pan (0.01 lbs.)		
Compacted Depth of Lift					D	Wt. of Dried Material (0.01 lbs.) = B-C		
Method of Compaction					MC _T	% Moist. (0.1%) = [(A - B) / D] x 100		
No. of Passes with Roller					DENSITY CORRECTION FOR OVERSIZE PARTICLES⁽²⁾ (+			
Nuclear Gauge	1. Daily Standard Count				No. 4 sieve)			
	2. Wet Density From Gauge (0.1 lbs./ft ³)				11.	Dry Wt. of + No. 4 Material (0.01 lbs)		
	3. Dry Density From Gauge (information only)				12.	% + No. 4 Mat.(P _c) (0.1%) (line 11 / line D) x 100		
	4. Percent Moisture From Gauge (information only)				13.	% -No. 4 Mat. (P _f) (0.1%) 100 - line 12		
5. Percent Moisture (0.1%) MC _T or use line 22					14.	Dry Den. (D _d) (0.1 lbs/ft ³) line 2 / [1+ (MC _T / 100)]		
6. Optimum Moisture from Lab or 1-Point (1%)					15.	D _f Denominator (0.01) (line 14 x line 12) / 162.24		
7. Dry Density (0.1 lbs./ft ³) (line 2 / [1 + (line 5 / 100)] or use line 18					16.	D _f Denominator (0.01) 100 - line 15		
8. Proctor Maximum Dry Density from Lab or 1-Point (0.1 lbs./ft ³)					17.	D _f Numerator (0.01) line 14 x line 13		
9. Percent Compaction (1%) line 7 / line 8 x 100					18.	Adj. Dry Den.(D _f) (0.1 lbs/ft ³) line 17 / line 16		
10. Percent Compaction Required 95 or 100%					MOISTURE CORRECTION FOR OVERSIZED PARTICLES⁽²⁾ (+			
Test Remarks	Pass/Fail				No. 4 sieve)			
	Lab Sample No.				19.	MC _f Numerator (0.001) 0.02 x line 12		
	Material Description				20.	MC _f Numerator (0.001) MC _T - line 19		
Remarks:					21.	Adj. Moist. (MC _f) (0.001) line 20 / line 13		
					22.	Adj. % Moisture (0.1%) line 21 x 100		

Note 1: ITM 506-Field Determination of Moisture Content of Soils used for all cohesive soils.

Note 2: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Assumes a moisture of 2% and a specific gravity of 2.60 for P_c.

Qualified Technician Signature: _____

I hereby certify that I am qualified in the above test methods

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF NUCLEAR DENSITY TESTS FOR SOIL (DIRECT TRANSMISSION)

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					% MOISTURE - ITM 506⁽¹⁾				
Location of Tests	Station				A	Mass of Pan & Wet Material (2 g)			
	Reference to Centerline				B	Mass of Pan & Dry Material (2 g)			
	Elevation or Lift Number				C	Mass of Pan (2 g)			
Compacted Depth of Lift					D	Mass of Dried Material (2 g) = B-C			
Method of Compaction					MC _T	% Moist. (0.1%) = [(A - B) / D] x 100			
No. of Passes with Roller					DENSITY CORRECTION FOR OVERSIZE PARTICLES⁽²⁾ (+ 4.75mm sieve)				
Nuclear Gauge	1. Daily Standard Count				11. Dry Mass of + 4.75mm Material (2 g)				
	2. Wet Density From Gauge (1 kg/m ³)				12. % +4.75mm Mat.(P _c) (0.1%) (line 11 / line D) x 100				
	3. Dry Density From Gauge (information only)				13. % -4.75mm Mat. (P _f) (0.1%) 100 - line 12				
	4. Percent Moisture From Gauge (information only)				14. Dry Den. (D _d) (1 kg/m ³) line 2 / [1+ (MC _T / 100)]				
5. Percent Moisture (0.1%) MC _T or use line 22					15. D _f Denominator (0.001) (line 14 x line 12) / 2600				
6. Optimum Moisture from Lab or 1-Point (1%)					16. D _f Denominator (0.001) 100 - line 15				
7. Dry Density (1 kg/m ³) (line 2 / [1 + (line 5 / 100)] or use line 18					17. D _f Numerator (0.1) line 14 x line 13				
8. Proctor Maximum Dry Density from Lab or 1-Point (1 kg/m ³)					18. Adj. Dry Den.(D _f) (1 kg/m ³) line 17 / line 16				
9. Percent Compaction (1%) line 7 / line 8 x 100					MOISTURE CORRECTION FOR OVERSIZED PARTICLES⁽²⁾ (+ 4.75mm sieve)				
10. Percent Compaction Required 95 or 100%					19. MC _f Numerator (0.001) 0.02 x line 12				
Test Remarks	Pass/Fail				20. MC _f Numerator (0.001) MC _T - line 19				
	Lab Sample No.				21. Adj. Moist. (MC _f) (0.001) line 20 / line 13				
	Material Description				22. Adj. % Moisture (0.1%) line 21 x 100				
Remarks:									

Note 1: ITM 506-Field Determination of Moisture Content of Soils used for all cohesive soils.

Note 2: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Calculations assume a moisture of 2% and a specific gravity of 2.60 for P_c.

Qualified Technician Signature: _____

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INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF NUCLEAR DENSITY TESTS FOR GRANULAR MATERIAL (BACKSCATTER)

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					% MOISTURE - AASHTO T 255 ⁽¹⁾			
Location of Tests	Station				A	Wt. of Pan & Wet Material (0.01 lbs.)		
	Reference to Centerline				B	Wt. of Pan & Dry Material (0.01 lbs.)		
	Elevation or Lift Number				C	Wt. of Pan (0.01 lbs.)		
Compacted Depth of Lift					D	Wt. of Dried Material (0.01 lbs.) = B-C		
Method of Compaction					MC _T	% Moist. (0.1%) = [(A - B) / D] x 100		
No. of Passes with Roller					DENSITY CORRECTION FOR OVERSIZE PARTICLES ⁽²⁾ (+ No. 4 or 3/4" sieve)			
Nuclear Gauge	1. Daily Standard Count				11. Dry Wt. of Oversized Material (0.01 lbs.)			
	2. Wet Density From Gauge (0.1 lbs./ft ³)				12. % Ovsiz. Mat.(P _c) (0.1%) (line 11 / line D) x 100			
	3. Dry Density From Gauge (information only)				13. % Fine Mat. (P _f) (0.1%) 100 - line 12			
	4. Percent Moisture From Gauge (information only)				14. Dry Den. (D _d) (0.1 lbs./ft ³) line 2 / [1+ (MC _T / 100)]			
5. Percent Moisture (0.1%) MC _T or use line 22					15. D _f Denominator (0.01) (line 14 x line 12) / 162.24			
6. Optimum Moisture from Lab (1%)					16. D _f Denominator (0.01) 100 - line 15			
7. Dry Density (0.1 lbs./ft ³) (line 2 / [1 + (line 5 / 100)] or use line 18					17. D _f Numerator (0.01) line 14 x line 13			
8. Proctor Maximum Dry Density from Lab (0.1 lbs./ft ³)					18. Adj. Dry Den.(D _f) (0.1 lbs./ft ³) line 17 / line 16			
9. Percent Compaction (1%) line 7 / line 8 x 100					MOISTURE CORRECTION FOR OVERSIZED PARTICLES ⁽²⁾ (+ 4.75mm or 19.0mm sieve)			
10. Percent Compaction Required 95 or 100%					19. MC _f Numerator (0.001) 0.02 x line 12			
Test Remarks	Pass/Fail				20. MC _f Numerator (0.001) MC _T - line 19			
	Lab Sample No.				21. Adj. Moist. (MC _f) (0.001) line 20 / line 13			
	Material Description				22. Adj. % Moisture (0.1%) line 21 x 100			
Remarks:								

Note 1: AASHTO T 255-Total Evaporable Moisture Content of Aggregates by Drying used for all aggregates and granular soils such as sand, B-Borrow sand and No. 4 & No. 30 structure backfills.

Note 2: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Assumes a moisture of 2% and a specific gravity of 2.60 for P_c.

Qualified Technician Signature: _____

I hereby certify that I am qualified in the above test methods

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF NUCLEAR DENSITY TESTS FOR GRANULAR MATERIAL (BACKSCATTER)

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					% MOISTURE - AASHTO T 255 ⁽¹⁾				
Location of Tests	Station				A	Mass of Pan & Wet Material (2 g)			
	Reference to Centerline				B	Mass of Pan & Dry Material (2 g)			
	Elevation or Lift Number				C	Mass of Pan (2 g)			
Compacted Depth of Lift					D	Mass of Dried Material (2 g) = B-C			
Method of Compaction					MC _T	% Moist. (0.1%) = [(A - B) / D] x 100			
No. of Passes with Roller					DENSITY CORRECTION FOR OVERSIZE PARTICLES ⁽²⁾ (+ 4.75mm or 19.0mm sieve)				
Nuclear Gauge	1. Daily Standard Count				11. Dry Mass of Oversized Material (2 g)				
	2. Wet Density From Gauge (1 kg/m ³)				12. % Ovsiz. Mat.(P _c) (0.1%) (line 11 / line D) x 100				
	3. Dry Density From Gauge (information only)				13. % Fine Mat. (P _f) (0.1%) 100 - line 12				
	4. Percent Moisture From Gauge (information only)				14. Dry Den. (D _d) (1 kg/m ³) line 2 / [1+ (MC _T / 100)]				
5. Percent Moisture (0.1%) MC _T or use line 22					15. D _f Denominator (0.001) (line 14 x line 12) / 2600				
6. Optimum Moisture from Lab (1%)					16. D _f Denominator (0.001) 100 - line 15				
7. Dry Density (1 kg/m ³) (line 2 / [1 + (line 5 / 100)] or use line 18					17. D _f Numerator (0.1) line 14 x line 13				
8. Proctor Maximum Dry Density from Lab (1 kg/m ³)					18. Adj. Dry Den.(D _f) (1 kg/m ³) line 17 / line 16				
9. Percent Compaction (1%) line 7 / line 8 x 100					MOISTURE CORRECTION FOR OVERSIZED PARTICLES ⁽²⁾ (+ 4.75mm or 19.0mm sieve)				
10. Percent Compaction Required 95 or 100%					19. MC _f Numerator (0.001) 0.02 x line 12				
Test Remarks	Pass/Fail				20. MC _f Numerator (0.001) MC _T - line 19				
	Lab Sample No.				21. Adj. Moist. (MC _f) (0.001) line 20 / line 13				
	Material Description				22. Adj. % Moisture (0.1%) line 21 x 100				
Remarks:									

Note 1: AASHTO T 255-Total Evaporable Moisture Content of Aggregates by Drying used for all aggregates and granular soils such as sand, B-Borrow sand and 4.75mm & 600µm structure backfills.

Note 2: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Calculations assume a moisture of 2% and a specific gravity of 2.60 for P_c.

Qualified Technician Signature: _____

I hereby certify that I am qualified in the above test methods

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF MOISTURE DETERMINATION TESTS

Date: _____ Contract No. _____ Project No. _____ Road No. _____

ITM 506¹ and AASHTO T 255²

Field Test Number						Minimum Sample Weights lbs. (g)
Location of Tests	Station					
	Reference to Centerline					
	Elevation or Lift Number					
1. Weight of Pan & Wet Material (0.01 lbs.)						Soil (ITM 506) ¹ 2.20 lbs. (1000 g)
2. Weight of Pan & Dry Material (0.01 lbs.)						#8 Stone (ITM 403) ³ 11.00 lbs. (5000 g)
3. Weight of Moisture (0.01 lbs.) line 1 - line 2						#23 Sand (ITM 403) ³ 11.00 lbs. (5000 g)
4. Weight of Pan (0.01 lbs.)						#30 Structure Backfill 1.10 lbs. (500 g)
5. Weight of Dry Material (0.01 lbs.) line 2 - line 4						#4 Structure Backfill 1.10 lbs. (500 g)
Percent Moisture (0.1%) (line 3 / line 5) x 100						53 Compacted Agg. 8.80 lbs. (4000 g)
Material Description (53 stone, B-borrow, Sandy Clay, etc.)						73 Compacted Agg. 6.60 lbs. (3000g)
						1.5" Structure Backfill 8.80 Lbs. (4000 g)

¹ ITM 506 defines constant weight as the weight at which further drying at 5 minute intervals would cause less than 0.1% additional loss in weight.

² AASHTO 255 defines constant weight as when further heating causes, or would cause, less than 0.1 percent additional loss in weight.

³ ITM 403 defines constant weight as when the sample weight decreases by less than 0.01 lbs. (5 g) over 5 minutes of heating.

Qualified Technician Signature: _____

I hereby certify that I am a qualified technician and the tests were conducted in accordance with proper test methods.

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF MOISTURE DETERMINATION TESTS

Date: _____ Contract No. _____ Project No. _____ Road No. _____

ITM 506¹ and AASHTO T 255²

Field Test Number						Minimum Sample Masses
Location of Tests	Station					
	Reference to Centerline					
	Elevation or Lift Number					
1. Mass of Pan & Wet Material (2 g)						Soil (ITM 506) ¹ 1000 g
2. Mass of Pan & Dry Material (2 g)						#8 Stone (ITM 403) ³ 5000 g
3. Mass of Moisture (2 g) line 1 - line 2						#23 Sand (ITM 403) ³ 5000 g
4. Mass of Pan (2 g)						#30 Structure Backfill 500 g
5. Mass of Dry Material (2 g) line 2 - line 4						#4 Structure Backfill 500 g
Percent Moisture (0.1%) (line 3 / line 5) x 100						53 Compacted Agg. 4000 g
Material Description (53 stone, B-borrow, Sandy Clay, etc.)						73 Compacted Agg. 3000 g
						1.5" Structure Backfill 4000 g

¹ ITM 506 defines constant mass as the mass at which further drying at 5 minute intervals would cause less than 0.1% additional loss in mass.

² AASHTO 255 defines constant mass as when further heating causes, or would cause, less than 0.1 percent additional loss in mass.

³ ITM 403 defines constant mass as when the sample mass decreases by less than 5 g over 5 minutes of heating.

Qualified Technician Signature: _____

I hereby certify that I am a qualified technician and the tests were conducted in accordance with proper test methods.

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF SOIL IN-PLACE DENSITY TESTS

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					CONE CORRECTION (C_c)				
Location of Tests	Station				m_1	Wt. of Apparatus Filled w/ Sand (0.01 lbs.)			
	Reference to Centerline				m_2	Wt. of Apparatus & Remaining Sand			
	Elevation or Lift Number				C_c	Cone Correction (0.01 lbs.) = $m_1 - m_2$			
Compacted Depth of Lift					BULK DENSITY OF SAND (D_B)				
Method of Compaction					m_3	Wt. of Apparatus Filled w/ Sand (0.01 lbs.)			
No. of Passes with Roller					m_4	Wt. of Apparatus & Remaining Sand			
Soil	1. Wet Wt. of Mat. from Hole & Pan (0.01 lbs.)				V_c	Volume of Calibration Container (0.0001ft ³)			
	2. Wt. Of Pan (0.01 lbs.)				D_B	Blk. D. Sand (0.1 lbs./ft ³) = $(m_3 - m_4 - C_c) / V_c$			
	3. Moist Wt. of Mat. (M_{ws}) (0.01 lbs.) line 1- line 2				% MOISTURE - ITM 506 ⁽¹⁾ or AASHTO T 255 ⁽²⁾				
	4. Dry Wt. of Mat. (M_{DS}) (0.01 lbs.) line 3 / $[1 + (MC_T / 100)]$				A	Wt. of Pan & Wet Material (0.01 lbs.)			
Sand Cone	5. Initial Wt. of Filled Apparatus (m_5) (0.01 lbs.)				B	Wt. of Pan & Dry Material (0.01 lbs.)			
	6. Final Wt. of Apparatus & Sand (m_6) (0.01 lbs.)				C	Wt. of Pan (0.01 lbs.)			
	7. Net Wt. of Sand (0.01 lbs.) line 5 - line 6				D	Wt. of Dried Material (0.01 lbs.) = B-C			
	8. Wt. of Sand in Hole (0.01 lbs.) line 7 - C_c				MC_T	% Moist. (0.1%) = $[(A - B) / D] \times 100$			
	9. Vol. of Test Hole (V_H) (0.0001 ft ³) line 8 / D_B				DENSITY CORRECTION FOR OVERSIZE PARTICLES (+ No. 4) ⁽³⁾				
10. Percent Moisture (0.1%) MC_T or use (line 19 x 100)					16. Dry Wt. of + No. 4 Material (0.01 lbs.)				
11. Proctor Optimum Moisture (1%)					17. % +No. 4 Mat. (P_c) (0.1%) (line 16 / line D) x 100				
12. Dry Density of Mat. (D_D) (0.1 lb./ft ³) (line 4 / line 9) or use line 23					18. % - No. 4 Mat. (P_f) (0.1%) 100 - line 17				
13. Proctor Maximum Dry Density (0.1 lbs./ft ³)					19. MC_f (0.001) $[MC_T - (0.02 \times \text{line } 17)] / \text{line } 18$				
14. Percent Compaction (1%) (line 12 / line 13) x 100					20. Dry Density (D_d) (0.1 lbs./ft ³) line 4 / line 9				
15. Percent Compaction Required 95% or 100%					21. D_f Denominator (0.01) (line 20 x line 17) / 162.24				
Test Remarks	Pass/Fail				22. D_f Numerator (0.01) line 20 x line 18				
	Lab Sample No.				23. Adj. Dry Den. (D_f) (0.1 pcf) line 22 / (100 - line 21)				
	Material Description				Remarks:				

Note 1: ITM 506-Field Determination of Moisture Content of Soils used for all cohesive soils.

Note 2: AASHTO T 255-Total Evaporable Moisture Content of Aggregate by Drying used for drying sand, B-Borrow sand and No. 4 & No. 30 Structure Backfill.

Note 3: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Assumes a moisture of 2% and a specific gravity of 2.60 for P_c .

Qualified Technician

Signature _____

I hereby certify that I am qualified in the above test methods

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF SOIL IN-PLACE DENSITY TESTS

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					CONE CORRECTION (C_c)				
Location of Tests	Station				m_1	Mass of Apparatus Filled w/ Sand (2 g)			
	Reference to Centerline				m_2	Mass of Apparatus & Remaining Sand (2 g)			
	Elevation or Lift Number				C_c	Cone Correction (2 g) = $m_1 - m_2$			
Compacted Depth of Lift					BULK DENSITY OF SAND (D_B)				
Method of Compaction					m_3	Mass of Apparatus Filled w/ Sand (2 g)			
No. of Passes with Roller					m_4	Mass of Apparatus & Remaining Sand (2 g)			
Soil	1. Wet Mass of Mat. from Hole & Pan (2 g)				V_c	Vol. of Calibration Container (1 cm ³)			
	2. Mass Of Pan (2 g)				D_B	Blk. D. Sand (0.01 g/cm ³) = $(m_3 - m_4 - C_c) / V_c$			
	3. Moist Mass of Mat. (M_{ws}) (2 g) line 1- line 2				% MOISTURE - ITM 506⁽¹⁾ or AASHTO T 255⁽²⁾				
	4. Dry Mass of Mat. (M_{DS}) (1 g) line 3 / [1+(MC_T / 100)]				A	Mass of Pan & Wet Material (2 g)			
Sand Cone	5. Initial Mass of Filled Apparatus (m_5) (2 g)				B	Mass of Pan & Dry Material (2 g)			
	6. Final Mass of Apparatus & Sand (m_6) (2 g)				C	Mass of Pan (2 g)			
	7. Net Mass of Sand (2 g) line 5 - line 6				D	Mass of Dried Material (2 g) = B-C			
	8. Mass of Sand in Hole (2 g) line 7 - C_c				MC_T	% Moist. (0.1%) = [(A - B) / D] x 100			
	9. Vol. of Test Hole (V_H) (1 cm ³) line 8 / D_B				DENSITY CORRECTION FOR OVERSIZE PARTICLES (+ 4.75mm)⁽³⁾				
10. Percent Moisture (0.1%) MC_T or use line 19 x 100					16. Dry Mass of + 4.75mm Material (2 g)				
11. Proctor Optimum Moisture (1%)					17. % +4.75mm Mat.(P_c) (0.1%) (line 16 / line D) x 100				
12. Dry Den. of Mat. (D_D) (1 kg/m ³) (line 4 / line 9) x 1000 or use line 23					18. % -4.75mm Mat. (P_f) (0.1%) 100 - line 17				
13. Proctor Maximum Dry Density (1 kg/m ³)					19. MC_f (0.001) [MC_T - (0.02 x line 17)] / line 18				
14. Percent Compaction (1%) (line 12 / line 13) x 100					20. Dry Density (D_d) (1 kg/m ³) (line 4 / line 9) x 1000				
15. Percent Compaction Required 95% or 100%					21. D_f Denominator (0.001) (line 20 x line 17) / 2600				
Test Remarks	Pass/Fail				22. D_f Numerator (0.1) line 20 x line 18				
	Lab Sample No.				23. Adj. Dry Den.(D_f) (1 kg/m ³) line 22 / (100 - line 21)				
	Material Description				Remarks:				

Note 1: ITM 506-Field Determination of Moisture Content of Soils used for all cohesive soils.

Note 2: AASHTO T 255-Total Evaporable Moisture Content of Aggregate by Drying used for drying sand, B-Borrow sand and 4.75mm & 600µm Structure Backfill.

Note 3: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Assume a moisture of 2% and a specific gravity of 2.60 for P_c .

Qualified Technician

Signature _____

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INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF IN-PLACE DENSITY TESTS (+3/4" Material)

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					CONE CORRECTION (C_c)				
Location of Tests	Station				m_1	Wt. of Apparatus Filled w/ Sand (0.01 lbs.)			
	Reference to Centerline				m_2	Wt. of Apparatus & Remaining Sand			
	Elevation or Lift Number				C_c	Cone Correction (0.01 lbs.) = $m_1 - m_2$			
Compacted Depth of Lift					BULK DENSITY OF SAND (D_B)				
Method of Compaction					m_3	Wt. of Apparatus Filled w/ Sand (0.01 lbs.)			
No. of Passes with Roller					m_4	Wt. of Apparatus & Remaining Sand			
Compacted Material	1. Wet Wt. of Material from Hole & Pan (0.01 lbs.)					V_c	Volume of Calibration Container (0.0001ft ³)		
	2. Wt. Of Pan (0.01 lbs.)					D_B	Blk. D. Sand (0.1 lbs./ft ³) = $(m_3 - m_4 - C_c) / V_c$		
	3. Moist Wt. of Mat. (M_{ws}) (0.01 lbs.) line 1- line 2					% MOISTURE - AASHTO T 255			
	4. Dry Wt. of Mat. (M_{DS}) (0.01 lbs.) line 3 / $[1 + (MC_T / 100)]$					A	Wt. of Original Sample & Pan (0.01 lbs.)		
Sand Cone	5. Initial Wt. of Filled Apparatus (m_5) (0.01 lbs.)					B	Wt. of Dried Sample & Pan (0.01 lbs.)		
	6. Final Wt. of Apparatus & Sand (m_6) (0.01 lbs.)					C	Wt. of Pan (0.01 lbs.)		
	7. Net Wt. of Sand (0.01 lbs.) line 5 - line 6					D	Wt. of Dried Sample (0.01 lbs.) = B-C		
	8. Wt. of Sand in Hole (0.01 lbs.) line 7 - C_c					MC_T	% Moisture(0.1%) = $100(A - B) / D$		
	9. Vol. of Test Hole (V_H) (0.0001 ft ³) line 8 / D_B					DENSITY CORRECTION FOR OVERSIZE PARTICLES (+ 3/4")⁽¹⁾			
10. Percent Moisture (0.1%) MC_T or use (line 19 x 100)					16. Dry Wt. of +3/4" Material (0.01lbs.)				
11. Proctor Optimum Moisture (1%)					17. % +3/4" Mat. (P_c) (0.1%) (line 16 / line D) x 100				
12. Dry Density of Mat. (D_D) (0.1 lb./ft ³) (line 4 / line 9) or use line 23					18. % -3/4" Mat. (P_f) (0.1%) 100-line 17				
13. Proctor Maximum Dry Density (0.1 lbs./ft ³)					19. MC_f (0.001) $[MC_T - (0.02 \times \text{line } 17)] / \text{line } 18$				
14. Percent Compaction (1%) (line 12 / line 13) x 100					20. Dry Density (D_d) (0.1 lbs./ft ³) line 4 / line 9				
15. Percent Compaction Required 95% or 100%					21. D_f Denominator (0.01) (line 20 x line 17) / 162.24				
Test Remarks	Pass/Fail					22. D_f Numerator (0.01) line 20 x Line 18			
	Lab Sample No.					23. Adj. Dry Den. (D_f) (0.1 pcf) line 22 / (100 - line 21)			
	Material Description					Remarks:			

Note 1: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Assumes a moisture of 2% and a specific gravity of 2.60 for P_c .

Qualified Technician Signature: _____
I hereby certify that I am qualified in the above test methods

INDIANA DEPARTMENT OF TRANSPORTATION

DAILY SUMMARY OF IN-PLACE DENSITY TESTS (+19.0mm Material)

CONTRACT NO. _____ PROJECT NO. _____ ROAD NO. _____ DATE _____ WEATHER _____

Field Test Number					CONE CORRECTION (C_c)				
Location of Tests	Station				m_1	Mass of Apparatus Filled w/ Sand (2 g)			
	Reference to Centerline				m_2	Mass of Apparatus & Remaining Sand (2 g)			
	Elevation or Lift Number				C_c	Cone Correction (2 g) = $m_1 - m_2$			
Compacted Depth of Lift					BULK DENSITY OF SAND (D_B)				
Method of Compaction					m_3	Mass of Apparatus Filled w/ Sand (2 g)			
No. of Passes with Roller					m_4	Mass of Apparatus & Remaining Sand (2 g)			
Compacted Material	1. Wet Mass of Material from Hole & Pan (2 g)				V_c	Vol. of Calibration Container (1 cm ³)			
	2. Mass Of Pan (2 g)				D_B	Blk. D. Sand (0.01g/cm ³) = $(m_3 - m_4 - C_c) / V_c$			
	3. Moist Mass of Mat. (M_{ws}) (2 g) line 1- line 2				% MOISTURE - AASHTO T 255				
	4. Dry Mass of Mat. (M_{DS}) (1 g) line 3 / [1+(MC_T / 100)]				A	Mass of Original Sample & Pan (2 g)			
Sand Cone	5. Initial Mass of Filled Apparatus (m_5) (2 g)				B	Mass of Dried Sample & Pan (2 g)			
	6. Final Mass of Apparatus & Sand (m_6) (2 g)				C	Mass of Pan (2 g)			
	7. Net Mass of Sand (2 g) line 5 - line 6				D	Mass of Dried Sample (2 g) = B-C			
	8. Mass of Sand in Hole (2 g) line 7 - C_c				MC_T	% Moisture(0.1%) = $100(A - B) / D$			
	9. Vol. of Test Hole (V_H) (1 cm ³) line 8 / D_B				DENSITY CORRECTION FOR OVERSIZE PARTICLES (+ 19.0mm)⁽¹⁾				
10. Percent Moisture (0.1%) MC_T or use line 19 x 100					16. Dry Mass of +19.0mm Material (2 g)				
11. Proctor Optimum Moisture (1%)					17. % +19.0mm Mat.(P_c) (0.1%) (line 16 / line D) x 100				
12. Dry Den. of Mat.(D_D) (1 kg/m ³) (line 4 / line 9) x 1000 or use line 23					18. % -19.0mm Mat. (P_f) (0.1%) 100-line 17				
13. Proctor Maximum Dry Density (1 kg/m ³)					19. MC_f (0.001) [$MC_T - (0.02 \times \text{line } 17)$] / line 18				
14. Percent Compaction (1%) (line 12 / line 13) x 100					20. Dry Density (D_d) (1 kg/m ³) (line 4 / line 9) x 1000				
15. Percent Compaction Required 95% or 100%					21. D_f Denominator (0.001) (line 20 x line 17) / 2600				
Test Remarks	Pass/Fail				22. D_f Numerator (0.1) line 20 x Line 18				
	Lab Sample No.				23. Adj. Dry Den.(D_f) (1 kg/m ³) line 22 / (100 - line 21)				
	Material Description				Remarks:				

Note 1: In accordance with AASHTO T 224-Correction for Coarse Particles in the Soil Compaction Test. Assume a moisture of 2% and a specific gravity of 2.60 for P_c .

Qualified Technician Signature: _____
I hereby certify that I am qualified in the above test methods

Revised 01/01/04

INDIANA DEPARTMENT OF TRANSPORTATION
AASHTO T 272-MAXIMUM DENSITY OPTIMUM MOISTURE BY ONE-POINT METHOD

Contract Number _____

Road Number _____

Date _____

Project Number _____

Field Test Number						
Location of Tests	Station					
	Reference to Centerline					
	Elevation or Lift Number					
1. Wet Weight of Compacted Soil & Mold (0.01 lbs.)	Weigh					
2. Weight of Mold (0.01 lbs.)	Weigh					
3. Wet Wt. of Compacted Soil (0.01 lbs.)	Line 1 - Line 2					
4. Wet Density of Compacted Soil (0.1 lbs./ft ³)	Line 3 x 30					
Percent Moisture (0.1%)	ITM 506					
Maximum Dry Density (0.1 lbs./ft ³)	From Curve					
Optimum Moisture Percent (0.1%)	From Curve					
Curve Number	From Curve					

ITM 506	1. Wt. of Pan & Wet Soil (W1) (0.01 lbs.)	Weigh				
	2. Wt. of Pan & Dry Soil (W2) (0.01 lbs.)	Weigh				
	3. Wt. of Moisture (0.01 lbs.)	Line 1 - Line 2				
	4. Wt. of Pan (W3) (0.01 lbs.)	Weigh				
	5. Wt. of Dry Material (0.01 lbs.)	Line 2 - Line 4				
	% Moisture (0.1%)	(Line 3 / Line 5) x 100				

Qualified Technician Signature: _____

I hereby certify that I am qualified in the above test methods

Revised 01/01/04
metric

INDIANA DEPARTMENT OF TRANSPORTATION
AASHTO T 272-MAXIMUM DENSITY OPTIMUM MOISTURE BY ONE-POINT METHOD

Contract Number _____

Road Number _____

Date _____

Project Number _____

Field Test Number						
Location of Tests	Station					
	Reference to Centerline					
	Elevation or Lift Number					
1. Wet Mass of Compacted Soil & Mold (0.002 kg)		Weigh				
2. Mass of Mold (0.002 kg)		Weigh				
3. Wet Mass of Compacted Soil (0.002 kg)		Line 1 - Line 2				
4. Wet Density of Compacted Soil (0.5 kg/m ³)		Line 3 x 1060				
Percent Moisture (0.1%)		ITM 506				
Maximum Dry Density (1 kg/m ³)		From Curve				
Optimum Moisture Percent (0.1%)		From Curve				
Curve Number		From Curve				

ITM 506	1. Mass of Pan & Wet Soil (W1) (0.002 kg)		Weigh				
	2. Mass of Pan & Dry Soil (W2) (0.002 kg)		Weigh				
	3. Mass of Moisture (0.002 kg)		Line 1 - Line 2				
	4. Mass of Pan (W3) (0.002 kg)		Weigh				
	5. Mass of Dry Material (0.002 kg)		Line 2 - Line 4				
	% Moisture (0.1%)		(Line 3 / Line 5) x 100				

Qualified Technician Signature: _____
I hereby certify that I am qualified in the above test methods